DETAILED ACTION

Claim Rejections - 35 USC § 103

1.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

2.   Claims 1, 2, 5-14, 16, 17, 19, 36 and 37 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Leung et al. (U.S. Patent 6,262,980) in view of Evans et al. (US 5,920,813).

As to claim 1, Figures 2 and 3 in Leung show a method comprising:

in a wireless communication system having sectors including a first sector and a second

sector, the first sector being in a first cell, the second sector being in a first cell or another cell

(see FIG. 3), altering the SIR of at least one user in the first sector, the at least one user in the

first sector being in communication with the communication system only via the first sector

("FIG. 2 shows a service area in a wireless network divided into hexagon shaped cells. Each cell

is further divided into multiple sectors numbered 1 to 6, and each sector is covered by a sector

antenna co-located with a Base Station (BS), not shown in FIG. 2, at the center of the cell" (Col.

6, lines 51-56). "Time is slotted such that a packet can be transmitted in each slot, and the

downlink and uplink between terminals and BS are provided by Time-Division Duplex (TDD)

using the same radio spectrum" (Col. 6, lines 64-67). "Time slots need to be dynamically

allocated to various transmitters to send data packets such that a given SIR can be achieved at the

intended receiver for successful reception" (Col. 7, lines 2-5). "When the receiving locations are

poor, few BS's should be scheduled to transmit at the same time so that a target SIR threshold

can be met for successful reception at the receiving ends" (Col. 7, lines 31-34). "In the SRA

method, time slots are grouped into 6 subframes and sectors are labeled by 1 to 6 anti-clock-wise

as shown in FIG. 2" (Col. 7, lines 63-65). "It is easy to see from FIG. 3 that if all sectors have

traffic load of less than one-sixth of total channel capacity, all packets are transmitted in different

time subframes (labeled "a" in each sector), thus causing no interference within the same cell"

(Col. 8, lines 28-32). "Besides managing intra-cell interference, the SRA method helps avoid

interference from major sources in the neighboring cells. This is particularly so when the traffic

load is low to moderate. Consider the downlink for Sector 1 in the middle cell of FIG. 2. Sector 2

in the bottom cell and Sector 3 in the upper cell are the major sources of interference. By

examining the staggered order for Sector 1, 2 and 3, note that they will not transmit

simultaneously, and thus will not interfere with each other, provided each has a traffic load of

less than one-third of total channel capacity (i.e., using only subframes a and b for transmission)"

(Col. 8, lines 38-48)).

  Leung fails to specifically disclose reducing transmission power on a forward link in the

second sector, determined based on a determination of a current state of transmissions to one or

more users in the second sector, each of the one or more users in the second sector being in

communication with the communication system only via the second sector, and later increasing

transmission power. However, in an analogous art, Evans teaches a sectorized cell in which

transmission power is reduced on a forward link in a sector, dynamically determined based on a

determination of a current state of transmissions to one or more users in the sector, each of the

one or more users in the second sector being in communication with the communication system

only via the sector, and then transmission power is increased. See col. 11, lines 36-47.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the

invention was made to modify the method of Leung by incorporating the features taught by

Evans for the purpose of avoiding having to reduce transmit power of all sectors of the cell and

thereby conserving system resources.

     As to claim 2, the Leung reference discloses the method of claim 1 in which the pattern is

organized in a sequence of time slots and the pattern defines which of the sectors has

transmissions turned on or off in each of the time slots ("it is easy to see from FIG. 3 that if all

sectors have traffic load of less than one-sixth of total channel capacity, all packets are

transmitted in different time subframes (labeled "a" in each sector), thus causing no interference

within the same cell" (Col. 8, lines 28-32). "Besides managing intra-cell interference, the SRA

method helps avoid interference from major sources in the neighboring cells. This is particularly

so when the traffic load is low to moderate. Consider the downlink for Sector 1 in the middle cell

of FIG. 2. Sector 2 in the bottom cell and Sector 3 in the upper cell are the major sources of

interference. By examining the staggered order for Sector 1, 2 and 3, note that they will not

transmit simultaneously, and thus will not interfere with each other, provided each has a traffic

load of less than one-third of total channel capacity (i.e., using only subframes a and b for

transmission)" (Col. 8, lines 38-48)).

     As to claim 5, the Leung reference discloses the method of claim 4 in which the current

state of transmissions includes a status of transmissions scheduled in the second sector (see Col.

7, lines 22-42).

As to claim 6, the Leung reference discloses the method of claim 5 in which the current state of transmissions includes transmission rates of the second sector ("traffic load" in Col. 11, line 32 to Col. 12, line 16).

As to claim 7, the Leung reference discloses the method of claim 4 in which the current state of transmissions includes a next time slot usage at the second sector ("in the ESRA method, the procedure shown in FIG. 6 is invoked for each time frame by each sector in every cell to assign available time slots in the frame to pending packets for transmission. Once a packet is scheduled for transmission in a time slot, the slot becomes unavailable to other packets" (Col. 10, line 65 to Col. 11, line 3)).

As to claim 8, the Leung reference discloses the method of claim 4 in which the current state of transmissions includes a forward link SIR of users in the at least one other sector (see Figure 4 and Col. 9, lines 31-58).

As to claim 9, the Leung reference discloses the method of claim 4 in which the current state of transmissions includes user location ("depending on terrain and fading, a certain terminal (e.g., house) may be constantly unable to receive a signal with a satisfactory SIR due to its fixed location. The transmission for other terminals may always be successful. Thus, terminals at "good" and "poor" locations should be served according to different time-slot reuse patterns, which is called Time Slot Reuse Partitioning (TSRP)" (Col. 7, lines 22-28)).

As to claim 10, the Leung reference discloses the method of claim 4 in which the current state of transmissions includes a fairness setting for one or more users ("without loss of generality, consider that terminals of all classes have an identical traffic load" (Col. 11, lines 38-39). "Using ESRA terminal classification and scheduling, packet transmission for all terminal

classes can be successfully received given a specific SIR threshold" (Col. 15, lines 52-54). See

also Col. 11, line 32 to Col. 12, line 16).

As to claim 11, the Leung reference discloses the method of claim 4 in which the current

state of transmissions includes an application type of one or more user or QoS level for one or

more users ("to ensure the required reception quality in the given environment, only time slots in

subframes a, b and c as indicated in FIG. 3 would be used for transmission in each sector. The

control limits the degree of concurrent transmissions, and thus the amount of interference, to

achieve a target SIR for the desirable quality of service ("QoS")" (Col. 8, lines 60-65)).

As to claim 12, the Leung reference discloses the method of claim 1 in which temporarily

reducing the transmissions comprises turning transmissions on and off in selected sectors

according to the pattern ("it is easy to see from FIG. 3 that if all sectors have traffic load of less

than one-sixth of total channel capacity, all packets are transmitted in different time subframes

(labeled "a" in each sector), thus causing no interference within the same cell" (Col. 8, lines 28-

32). "Besides managing intra-cell interference, the SRA method helps avoid interference from

major sources in the neighboring cells. This is particularly so when the traffic load is low to

moderate. Consider the downlink for Sector 1 in the middle cell of FIG. 2. Sector 2 in the bottom

cell and Sector 3 in the upper cell are the major sources of interference. By examining the

staggered order for Sector 1, 2 and 3, note that they will not transmit simultaneously, and thus

will not interfere with each other, provided each has a traffic load of less than one-third of total

channel capacity (i.e., using only subframes a and b for transmission)" (Col. 8, lines 38-48)).

As to claim 13, the Leung reference discloses the method of claim 12 in which the pattern

includes turning off transmissions in the sector sector more frequently to help users in the first

sector having lower communication rates ("TSRP divides the time frame (i.e., bandwidth) into a

dedicated portion and a shared portion. At most one packet is transmitted among four

neighboring cells during each time slot in the dedicated portion and up to three packets can be

transmitted simultaneously in every cell in the shared portion. The purpose is to allow terminals

at "good" and "poor" locations to use time slots in the dedicated and shared portion,

respectively" (Col. 7, lines 35-42)).

     As to claim 14, the Leung reference discloses the method of claim 1 also including

arranging a frequency reuse factor of one or higher in the wireless system ("FIG. 2 shows a

service area in a wireless network divided into hexagon shaped cells. Each cell is further divided

into multiple sectors numbered 1 to 6, and each sector is covered by a sector antenna co-located

with a Base Station (BS), not shown in FIG. 2, at the center of the cell" (Col. 6, lines 51-56). As

the applicant specification described that "Figure 1 shows frequency or time reuse factor of

three" for three-sectored cells (page 6, line 18), Figure 2 in Leung shows six-sectored cells and

thus, a frequency reuse factor of six).

     As to claim 16, the Leung reference discloses apparatus comprising

     wireless transmission facilities ("sector antennas") for sectors including a first sector and

a second sector of a wireless communication system, the first sector being in a first cell, the

second sector being in the first cell or another cell ("FIG. 2 shows a service area in a wireless

network divided into hexagon shaped cells. Each cell is further divided into multiple sectors

numbered 1 to 6, and each sector is covered by a sector antenna co-located with a Base Station

(BS), not shown in FIG. 2, at the center of the cell" (Col. 6, lines 51-56)), and

control facilities ("Base Stations") connected to the wireless transmission facilities and configured to alter the SIR of at least one user in the first sector. ("time is slotted such that a packet can be transmitted in each slot, and the downlink and uplink between terminals and BS are provided by Time-Division Duplex (TDD) using the same radio spectrum" (Col. 6, lines 64-67). "Time slots need to be dynamically allocated to various transmitters to send data packets such that a given SIR can be achieved at the intended receiver for successful reception" (Col. 7, lines 2-5). "When the receiving locations are poor, few BS's should be scheduled to transmit at the same time so that a target SIR threshold can be met for successful reception at the receiving ends" (Col. 7, lines 31-34). "In the SRA method, time slots are grouped into 6 subframes and sectors are labeled by 1 to 6 anti-clock-wise as shown in FIG. 2" (Col. 7, lines 63-65). "It is easy to see from FIG. 3 that if all sectors have traffic load of less than one-sixth of total channel capacity, all packets are transmitted in different time subframes (labeled "a" in each sector), thus causing no interference within the same cell" (Col. 8, lines 28-32). "Besides managing intra-cell interference, the SRA method helps avoid interference from major sources in the neighboring cells. This is particularly so when the traffic load is low to moderate. Consider the downlink for Sector 1 in the middle cell of FIG. 2. Sector 2 in the bottom cell and Sector 3 in the upper cell are the major sources of interference. By examining the staggered order for Sector 1, 2 and 3, note that they will not transmit simultaneously, and thus will not interfere with each other, provided each has a traffic load of less than one-third of total channel capacity (i.e., using only subframes a and b for transmission)" (Col. 8, lines 38-48)).

Leung fails to specifically disclose reducing transmission power on a forward link in the second sector, determined based on a determination of a current state of transmissions to one or

more users in the second sector, each of the one or more users in the second sector being in
communication with the communication system only via the second sector, and later increasing
transmission power. However, in an analogous art, Evans teaches a sectorized cell in which
transmission power is reduced on a forward link in a sector, dynamically determined based on a
determination of a current state of transmissions to one or more users in the sector, each of the
one or more users in the second sector being in communication with the communication system
only via the sector, and then transmission power is increased. See col. 11, lines 36-47.
Therefore, it would have been obvious to one having ordinary skill in the art at the time the
invention was made to modify the method of Leung by incorporating the features taught by
Evans for the purpose of avoiding having to reduce transmit power of all sectors of the cell and
thereby conserving system resources.

 As to claim 17, the Leung reference discloses the apparatus of claim 16 in which the
control facilities comprise sector controllers for controlling the wireless transmission facilities
for the respective sectors ("FIG. 2 shows a service area in a wireless network divided into
hexagon shaped cells. Each cell is further divided into multiple sectors numbered 1 to 6, and
each sector is covered by a sector antenna co-located with a Base Station (BS), not shown in
FIG. 2, at the center of the cell" (Col. 6, lines 51-56). It is inherent that a Base Station comprises
sector controllers to control the sector antennas).

 As to claim 19, the Leung reference discloses apparatus comprising

 a sector controller adapted to control transmissions in a first sector of a first cell of a
wireless communication system, the transmissions in the first sector being to at least one user in
the first sector, the at least one user communicating with the communication system only via the

first sector, the sector controller further adapted to alter the SIR of the at least one user in the first

sector by communication with other sector controllers in the first cell or in a second cell ("FIG.

2 shows a service area in a wireless network divided into hexagon shaped cells. Each cell is

further divided into multiple sectors numbered 1 to 6, and each sector is covered by a sector

antenna co-located with a Base Station (BS), not shown in FIG. 2, at the center of the cell" (Col.

6, lines 51-56). It is inherent that a Base Station comprises sector controllers to control the sector

antennas. "Time is slotted such that a packet can be transmitted in each slot, and the downlink

and uplink between terminals and BS are provided by Time-Division Duplex (TDD) using the

same radio spectrum" (Col. 6, lines 64-67). "Time slots need to be dynamically allocated to

various transmitters to send data packets such that a given SIR can be achieved at the intended

receiver for successful reception" (Col. 7, lines 2-5). "When the receiving locations are poor, few

BS's should be scheduled to transmit at the same time so that a target SIR threshold can be met

for successful reception at the receiving ends" (Col. 7, lines 31-34). "In the SRA method, time

slots are grouped into 6 subframes and sectors are labeled by 1 to 6 anti-clock-wise as shown in

FIG. 2" (Col. 7, lines 63-65). "It is easy to see from FIG. 3 that if all sectors have traffic load of

less than one-sixth of total channel capacity, all packets are transmitted in different time

subframes (labeled "a" in each sector), thus causing no interference within the same cell" (Col. 8,

lines 28-32). "Besides managing intra-cell interference, the SRA method helps avoid interference

from major sources in the neighboring cells. This is particularly so when the traffic load is low to

moderate. Consider the downlink for Sector 1 in the middle cell of FIG. 2. Sector 2 in the bottom

cell and Sector 3 in the upper cell are the major sources of interference. By examining the

staggered order for Sector 1, 2 and 3, note that they will not transmit simultaneously, and thus

will not interfere with each other, provided each has a traffic load of less than one-third of total

channel capacity (i.e., using only subframes a and b for transmission)" (Col. 8, lines 38-48)).

      Leung fails to specifically disclose reducing transmission power on a forward link in the

second sector, determined based on a determination of a current state of transmissions to one or

more users in the second sector, each of the one or more users in the second sector being in

communication with the communication system only via the second sector, and later increasing

transmission power. However, in an analogous art, Evans teaches a sectorized cell in which

transmission power is reduced on a forward link in a sector, dynamically determined based on a

determination of a current state of transmissions to one or more users in the sector, each of the

one or more users in the second sector being in communication with the communication system

only via the sector, and then transmission power is increased. See col. 11, lines 36-47.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the

invention was made to modify the method of Leung by incorporating the features taught by

Evans for the purpose of avoiding having to reduce transmit power of all sectors of the cell and

thereby conserving system resources.

      As to claims 36 and 37, Leung discloses estimating a signal-to-interference-and-noise

ratio based on information received from the mobile station; and determining an encoding and

modulation scheme for the data packet based on the estimated signal-to-interference-and-noise

ratio. Moreover, each sector transmits a pilot signal and the received information comprises

information indicating a strength of the signals detected by the mobile station. See col. 2, lines

35-42.

3.   Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Leung et al. in

view of Evans, and further in view of 3GPP2 C.P9010, CDMA 2000 High Rate Data Packet

Interface Specification, Ballot Resolution Version, September 12, 2000.

        As to claim 15, the combination of Leung and Evans discloses the method of claim 1. It

further discloses "the ESRA method could be used even for real-time traffic such as voice and

video services" (Col. 15, lines 60-62) and "although a TDMA system was used to illustrate

various embodiments of the invention, it can be appreciated that other systems fall within the

scope of the invention" (Col. 16, lines 18-21). However, Leung and Evans do not explicitly

disclose the wireless system comprises 1xEV-DO. The 3GPP2 C.P9010 reference teaches the

wireless system comprises 1xEV-DO (see pages 1-1 to 1-11).

        Therefore, it would have been obvious to one having ordinary skill in the art at the time

the invention was made to modify the method of Leung and Evans in which the wireless system

comprises 1xEV-DO, as taught by 3GPP2 C.P9010, in order to support other new wireless

systems.

                                            Response to Arguments

4.   Applicant's arguments with respect to the claims have been considered but are moot in

view of the new ground(s) of rejection.

                                                Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sam Bhattacharya whose telephone number is (571) 272-7917. The examiner can normally be reached on Weekdays, 9-6, with first Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, George Eng can be reached on (571) 272-7495. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

sb

/Sam Bhattacharya/

Examiner, Art Unit 2617